

What is claimed is:

1. 1. A method of optical signal regeneration comprising the steps of:
  - 2 generating a phase and amplitude encoded clock signal from at least an input optical signal;
  - 4 introducing the encoded clock signal into a delay interference section of the regenerator such that an amplitude modulated clock signal is produced; and
  - 6 outputting the amplitude modulated clock signal wherein the output amplitude modulated clock signal preserves information present within the input optical signal.
- 1 2. The method according to claim 1 wherein said delay interference comprises the steps of:  $N$ 
  - 3 splitting the encoded clock signal into at least two optical signals; and
  - 4 delaying one of the encoded signals by an amount  $\Delta t$  from another signal wherein $\Delta t \cong N * \Delta t_{clk}$ , where  $\Delta t_{clk}$  is a clock pulse time delay measured between subsequent clock signal pulses and  $N$  is an integer.
- 1 3. The method according to claim 2 further comprising the steps of:
  - 2 optically amplifying the amplitude modulated clock signal.
- 1 4. The method according to claim 2 further comprising the steps of:
  - 2 polarizing the amplitude modulated clock signal.
- 1 5. The method according to claim 2 wherein the delay interference section includes a birefringent fiber in optical communication with a phase shifter.
- 1 6. The method according to claim 5 wherein the delay interference section further includes a polarizer in optical communication with the phase shifter.
- 1 7. The method according to claim 1 wherein the generating step further includes the steps of:
  - 3 applying the input optical signal to a coupling section of an optical regenerator;
  - 4 and
  - 5 applying a clock signal to a modulation section of the optical regenerator.
- 1 8. The method according to claim 7 wherein said coupling section comprises a photodiode.